

CLAIM SET AS AMENDED

The amended claim set is as follows:

1. (Currently Amended) A method of conferring resistance to protoporphyrinogen oxidase-inhibiting herbicides upon plants or plant cells, comprising introducing a DNA fragment or a plasmid containing the DNA fragment into plants or plant cells or algal cells, wherein said DNA fragment ~~is expressed and~~ has the following characteristics:

(1) said DNA fragment is 2.6 to 13.8 kb in length;

(2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:1, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500µg/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment remains hybridized after washing in 2X SSC, 1% (w/v) SDS, wherein said sequence encodes an amino acid sequence ~~the part of the protein~~ in which the amino acid at the position corresponding ~~to valine at~~ position 13 of SEQ ID NO:1 is an amino acid other than valine ~~which is substituted by another amino acid~~; and

(3) said DNA fragment has an ability to confer resistance to protoporphyrinogen oxidase-inhibiting herbicides in plant or algal cells when introduced ~~expressed~~ therein.

2. (Previously Presented) The method according to claim 1, wherein the plant is a dicot.

3. (Cancelled).

4. (Previously Presented) The method according to claim 1, wherein the plant is a monocot.

5. (Cancelled).

6. (Previously Presented) The method according to claim 1, wherein the plant is the green algae *Chlamydomonas*.

7. (Currently Amended) The method according to any one of claims 1, 2, 4, 6, 43, 44, 45 or 46, wherein the amino acid at the position corresponding to ~~valine~~ at position 13 of SEQ ID NO:1 is replaced by methionine.

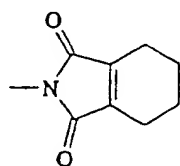
8-9. (Cancelled).

10. (Previously Presented) A plant or plant cells or green alga upon which resistance is conferred by the method described in any one of claims 1, 2, 4, 6, 7, 43, 44, 45 or 46.

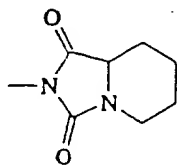
11. (Previously Presented) A method of selecting plant or algal cells upon which resistance to protoporphyrinogen-inhibiting herbicides is conferred, which comprises treating a population of plant or algal cells, upon which resistance to protoporphyrinogen-inhibiting herbicides is conferred by the method as described in any one of claims 1, 2, 4, 6, 7, 43, 44, 45 or 46, with a protoporphyrinogen-inhibiting herbicide in an amount which normally blocks growth of said plant or algal cells expressing only herbicide-sensitive protoporphyrinogen oxidase.

12. (Previously Presented) A method of controlling plants lacking resistance to protoporphyrinogen-inhibiting herbicides in cultivating fields of crop plants upon which resistance to protoporphyrinogen-inhibiting herbicides is conferred by the method as described in any one of claims 1, 2, 4, 6, 7, 43, 44, 45 or 46, which comprises applying to said field at least one protoporphyrinogen-inhibiting herbicide in effective amounts to inhibit growth of said plants lacking resistance to protoporphyrinogen-inhibiting herbicides.

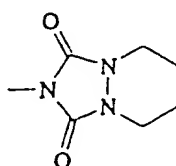
13. (Previously Presented) The method of controlling plants lacking resistance to protoporphyrinogen-inhibiting herbicides according to claim 12, wherein the protoporphyrinogen-inhibiting herbicides to be applied are selected from the group of compounds of the formula X-Q, wherein Q is selected from the group consisting of:



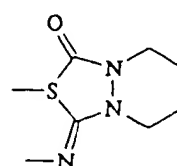
(Formula 1)



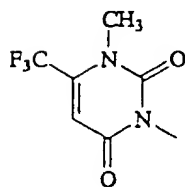
(Formula 2)



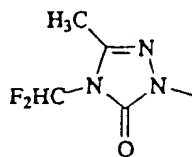
(Formula 3)



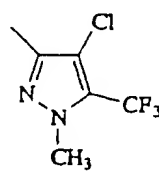
(Formula 4)



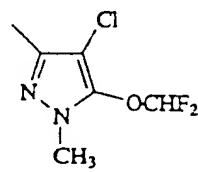
(Formula 5)



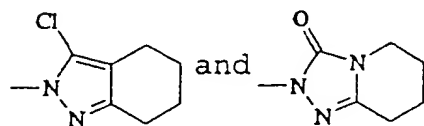
(Formula 6)



(Formula 7)



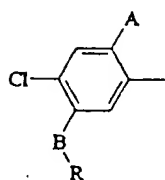
(Formula 8)



(Formula 9)

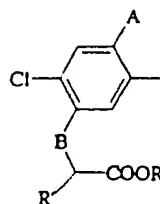
(Formula 10)

and X is selected from the group consisting of



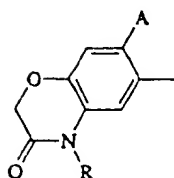
(Formula 11)

wherein
A = H, halogen
B = O, S
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl



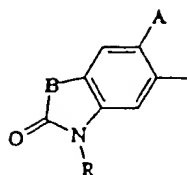
(Formula 12)

wherein
A = H, halogen
B = O, S
R' = H, CH₃
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl



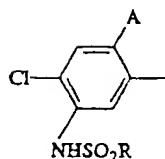
(Formula 13)

wherein
A = H, halogen
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl



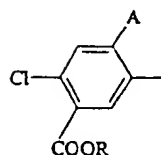
(Formula 14)

wherein
A = H, halogen
B = O, S
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl



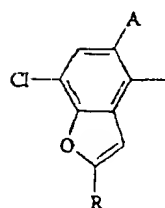
(Formula 15)

wherein
A = H, halogen
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl



(Formula 16)

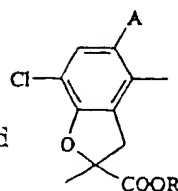
wherein
A = H, halogen
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl



(Formula 17)

wherein
A = H, halogen
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl

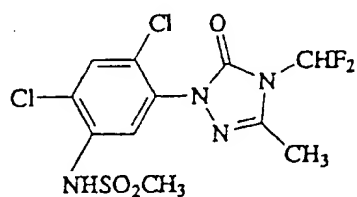
and



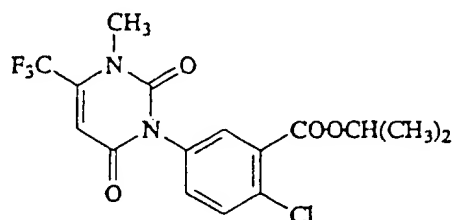
(Formula 18)

wherein
A = H, halogen
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl

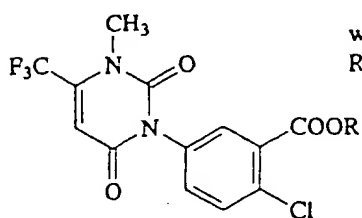
14. (Previously Presented) The method of controlling plants lacking resistance to protoporphyrinogen-inhibiting herbicides according to claim 12, wherein the protoporphyrinogen-inhibiting herbicide to be applied is selected from the group consisting of the compounds of the formula:



(Formula 19)

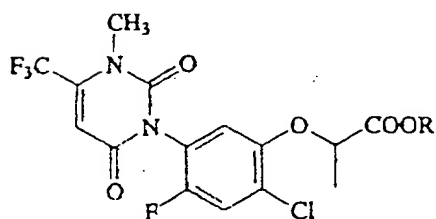


(Formula 20)



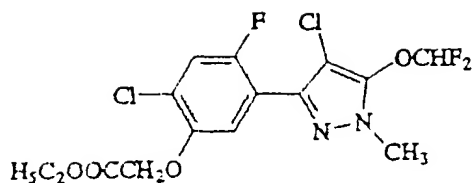
(Formula 21)

wherein
R = (C₂-C₅ alkenyloxy) C₁-C₄ alkyl



(Formula 22)

wherein
R = C₁-C₈ alkyl,
C₃-C₈ alkenyl,
C₃-C₈ alkynyl



(Formula 23)

lactofen,

[N-(4-chloro-2-fluoro-5-propargyloxy)phenyl-3,4,5,6-tetrahydrophthalimide,

pentyl [2-chloro-5-(cyclohex-1-ene-1,2-dicarboximido)-4-fluorophenoxy] acetate,

7-fluoro-6-[(3,4,5,6-tetrahydro)phthalimido]-4-(2-propynyl)-1,4-benzoxazin-3(2H)-one,

6-[(3,4,5,6-tetrahydro)phthalimido]-4-(2-propynyl)-1,4-benzoxazin-3(2H)-one,

2-[7-fluoro-3-oxo-4-(2-propynyl)-3,4-dihydro-2H-1,4-benzoxazin-6-yl]perhydroimidazo[1,5-a]pyridine-1,3-dione,

2-[(4-chloro-2-fluoro-5-propargyloxy)phenyl] perhydro-1H-1,2,4-triazolo-[1,2-a]pyridazine-1,3-dione,

2-[7-fluoro-3-oxo-4-(2-propynyl)-3,4-dihydro-2H-1,4-benzoxazin-6-yl]5,6,7,8-1,2,4-triazolo[4,3-a]pyridine-3H-one,

2-[3-oxo-4-(2-propynyl)-3,4-dihydro-2H-1,4-benzoxazin-6-yl]-1-methyl-6-trifluoromethyl-2,4(1H,3H)-pyrimidinedione,

2-[6-fluoro-2-oxo-3-(2-propynyl)-2,3-dihydrobenzthiazol-5-yl]-3,4,5,6-tetrahydrophthalimide, and

1-amino-2-[3-oxo-4-(2-propynyl)-3,4-dihydro-2H-1,4-benzoxazin-6-yl]-6-tri-fluoromethyl-2,4(1H,3H)-pyrimidinedione.

15. (Currently Amended) An isolated DNA fragment which has the following characteristics:

- (1) said DNA fragment is 2.6 to 13.8 kb in length;
- (2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:1, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500µg/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment or its complement remains hybridized after washing in 2X SSC, 1% (w/v) SDS, wherein said sequence encodes an amino

acid sequence in which the amino acid at the position
corresponding to ~~valine~~ at position 13 of SEQ ID NO:1 is an
amino acid other than valine ~~which is substituted by another~~
~~amino acid~~; and

(3) said DNA fragment has an ability to confer resistance
to protoporphyrinogen oxidase-inhibiting herbicides in plant
or algal cells when introduced ~~expressed~~ therein.

16. (Previously Presented) The isolated DNA fragment
according to claim 15, wherein the plant is a dicot.

17. (Cancelled).

18. (Previously Presented) The isolated DNA fragment
according to claim 15, wherein the plant is a monocot.

19. (Cancelled).

20. (Currently Amended) The isolated DNA fragment
according to claim 15, wherein the plant is the green alga
Chlamydomonas ~~and the DNA fragment encodes an amino acid~~
~~sequence resulting from replacement of Val13 of SEQ ID NO:1 by~~
~~another amino acid.~~

21. (Currently Amended) The isolated DNA fragment according to any of claims 15, 16, 18, 20 and 47, wherein said ~~another~~ amino acid other than valine is methionine.

22. (Currently Amended) The isolated DNA fragment according to claim 20, wherein the DNA fragment is isolated from genomic DNA of *Chlamydomonas*, and a nucleotide corresponding to ~~guanine~~ at position 37 (G37) of SEQ ID NO:4 is a nucleotide other than guanine ~~replaced with another nucleotide~~.

23. (Currently Amended) The isolated DNA fragment according to claim 22, wherein said ~~another~~ nucleotide other than guanine is adenine.

24. (Previously Presented) A plasmid comprising the DNA fragment described in claim 15.

25-42. (Cancelled).

43. (Previously Presented) The method of conferring resistance to protoporphyrinogen oxidase-inhibiting herbicides upon plants or plant cells or algal cells of claim 1, wherein said DNA fragment is 2.6 to 3.4 kb in length.

44. (Previously Presented) The method of conferring resistance to protoporphyrinogen oxidase-inhibiting herbicides upon plants or plant cells or algal cells of claim 1, wherein said DNA fragment is 2.6 to 10.0 kb in length.

45. (Previously Presented) The method of conferring resistance to protoporphyrinogen oxidase-inhibiting herbicides upon plants or plant cells or algal cells of claim 1, wherein said DNA fragment is obtained from a genomic DNA of a plant, a plant cell or an algal cell.

46. (Previously Presented) The method of conferring resistance to protoporphyrinogen oxidase-inhibiting herbicides upon plants or plant cells or algal cells of claim 1, wherein said DNA fragment is obtained from an algal cell.

47. (Previously Presented) The isolated DNA fragment according to claim 15, wherein said DNA fragment is 2.6 kb in length.

48. (New) A method of conferring resistance to protoporphyrinogen oxidase-inhibiting herbicides upon plants or plant cells, comprising introducing a DNA fragment or a

plasmid containing the DNA fragment into plants or plant cells or algal cells, wherein said DNA fragment has the following characteristics:

- (1) said DNA fragment is 2.6 to 13.8 kb in length;
- (2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence encoding the amino acid sequence of SEQ ID NO:1, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500µg/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment remains hybridized after washing in 0.2X SSC, 0.1% (w/v) SDS at 68°C, wherein said sequence encodes an amino acid sequence in which the amino acid at the position corresponding position 13 of SEQ ID NO:1 is an amino acid other than valine; and
- (3) said DNA fragment has an ability to confer resistance to protoporphyrinogen oxidase-inhibiting herbicides in plant or algal cells when introduced therein.

49. (New) A method of conferring resistance to protoporphyrinogen oxidase-inhibiting herbicides upon plants or plant cells, comprising introducing a DNA fragment or a plasmid containing the DNA fragment into plants or plant cells

or algal cells, wherein said DNA fragment has the following characteristics:

- (1) said DNA fragment is 2.6 to 13.8 kb in length;
- (2) said DNA fragment has a sequence that can be detected and isolated by DNA-DNA or DNA-RNA hybridization to a nucleic acid sequence that is complementary to a nucleotide sequence of SEQ ID NO:4, wherein said DNA-DNA or DNA-RNA hybridization occurs under 2X PIPES buffer, 50% deionized formamide, 0.5% (w/v) SDS, 500µg/ml denatured sonicated salmon sperm DNA at 42°C overnight; and said DNA fragment remains hybridized after washing in 0.2X SSC, 0.1% (w/v) SDS at 68°C, wherein said sequence encodes an amino acid sequence in which the amino acid at the position corresponding position 13 of SEQ ID NO:1 is an amino acid other than valine; and
- (3) said DNA fragment has an ability to confer resistance to protoporphyrinogen oxidase-inhibiting herbicides in plant or algal cells when introduced therein.